

App. No. 10/688147  
Office Action Dated April 15, 2004  
Amd. Dated July 14, 2004

### **REMARKS**

Reconsideration is respectfully requested in view of the above amendments and following remarks. Claims 25, 27, and 30 have been amended. No new matter has been added. Claims 25-30 are pending.

The abstract has been amended. No new matter has been added.

The title has been amended to read "A METHOD FOR FORMING A COMPOUND MAGNETIC THIN FILM".

#### **Claim rejections - 35 U.S.C. § 112**

Claims 27 and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Claims 27 and 30 have been amended. Applicants respectfully request reconsideration and withdrawal of this rejection.

#### **Claim rejections - 35 U.S.C. § 102**

Claims 25, 26, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Yokoyama et al. (US 4,889,767). Applicants respectfully traverse this rejection.

Independent claim 25 is directed to a method for manufacturing a magnetoresistive element. The oxide target comprises a compound comprising Fe and O.

The claimed invention teaches forming an oxide ferrite by sputtering using an oxide target containing iron and oxygen while applying a bias voltage to a substrate including a plane on which the oxide ferrite is to be formed so as to adjust an amount of oxygen supplied to the

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oxide ferrite from the oxide target. For example, when  $\text{Fe}_3\text{O}_4$  is used as the target,  $\text{Fe}_2\text{O}_3$  is formed at 0W (unbiased state),  $\text{Fe}_3\text{O}_4$  is formed at a bias of 5W and FeO is formed at a bias of 10W. As the bias increases the amount of oxygen decreases. Accordingly, a bias can be used to adjust the oxygen amount.

Yokoyama teaches a method of sputtering Co or Co plus N, Cr and/or P thin film on a substrate using an alloy or metal mixture corresponding to the composition of the desired metal thin film magnetic layer as the target. The thin film is then oxidized by plasma-oxidation treatment so as to introduce oxygen to the thin film.

The apparatus in Fig. 2 of Yokoyama is for the oxidizing treatment of the thin film surface by plasma-oxidation. Thus, the plasma treatment apparatus of Fig. 2 does not apply voltage during sputtering. The power source (54) only supplies voltage for the plasma treatment (column 4, lines 22-36).

Yokoyama fails to disclose or suggest applying a bias voltage to a substrate including a plane on which the oxide ferrite is to be formed during sputtering. Further, Yokoyama fails to disclose or suggest that bias sputtering can adjust the oxygen amount obtained in the iron oxide thin film. Withdrawal of the rejection is respectfully requested.

Independent claim 28 is directed to a method for forming a magnetic compound film. The magnetic compound film is formed while applying a bias voltage. As discussed above Yokoyama fails to disclose or suggest that sputtering is performed while applying a bias voltage.

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As discussed above for claim 25, a bias is used to adjust oxygen amount, therefore an effect similar to that of claim 25 can be obtained according to the method of claim 28. Withdrawal of the rejection is respectfully requested.

**Claim rejections - 35 U.S.C. § 103**

Claims 27 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokoyama et al. (US 4,889,767) in view of JP 1-239821. The secondary reference is cited only for the purpose of temperature limitations in claims 27 and 30. Even assuming this is correct, which the applicants do not concede, the deficiencies of Yokoyama noted above still stand. Withdrawal of the rejection is respectfully requested.

In view of the above, favorable reconsideration in the form of a notice of allowance is requested. Any questions or concerns regarding this communication can be directed to the undersigned attorney, Douglas P. Mueller, Reg. No. 30,300, at (612)371.5237.



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DPM:smm

Respectfully submitted,

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By

A handwritten signature in black ink, appearing to be "Douglas P. Mueller", written over a horizontal line.

Douglas P. Mueller  
Reg. No. 30,300